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ABSTRACT

Academic delay of gratification (ADOG) refers to students' postponement of immediately available opportunities to satisfy impulses in favor of pursuing academic goals that are temporally remote but ostensibly more valuable. This important form of self-regulation was studied among college students to determine how it serves to sustain effort over time in the face of obstacles. The focus in this review was on the links between delay and students' motivational tendencies and the use of learning strategies that serve to facilitate self-regulation. ADOG is discussed in view of the macro-analytic model of W. Mischel's cognitive-affective personality system. It is suggested that future research on delay as a learning process should consider B. Zimmerman's micro-analytic model of self-regulated learning cycle phases. The conceptual status and assessment of delay of gratification and implications for teaching and learning are discussed. (Contains 5 tables, 2 figures, a short summary, and 61 references.) (Author/SLD)

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Sustaining Learning through Academic Delay of Gratification: Choice and Strategy

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Abstract

Academic delay of gratification (ADOG) refers to students' postponement of immediately available opportunities to satisfy impulses in favor of pursuing academic goals that are temporally remote but ostensibly more valuable. We examined this important form of self-regulation among college students to determine how it serves to sustain effort over time in the face of obstacles. We focused on the links between delay and students' motivational tendencies and use of learning strategies that serve to facilitate self-regulation. Academic delay of gratification was discussed in view of the macro-analytic model of Mischel's cognitive-affective personality system. We suggested that future research on delay as a learning process should consider Zimmerman's micro-analytic model of self-regulated learning cycle phases. The conceptual status and assessment of delay of gratification and implication for teaching and learning were discussed.

Sustaining Learning through Academic Delay of Gratification: Choice and Strategy

"Most men [and women] don't know how to defer gratification."
Star Trek, Larell to Quark in Who Mourns for Morn?

"Naïve self-regulators remain dependent on others or must generate extraordinary personal motivation to delay gratification until distal goals are achieved."
Zimmerman, 1998

A fundamental challenge for educational psychologists is to understand the determinants of learners' ability to delay gratification in order to pursue valuable academic tasks. Academic delay of gratification refers to students' postponement of immediately available opportunities to satisfy impulses in favor of pursuing chosen important academic rewards or goals that are temporally remote but ostensibly more valuable (Bembenutty, 1997, Bembenutty & Karabenick, 1999). Delay is a component of self-regulation in which learners engage to protect task specific intentions from non-task alternatives (Butler & Winne, 1995; Corno, 1989; García, et al., 1998; García & Pintrich, 1994; Kuhl, 1985; Kuhl & Fuhrmann, 1998; McCann & García, 1999; Pintrich & García, 1991, 1994; Pintrich, Roeser, & De Groot. 1994; Xu & Corno, 1998; Zimmerman, 1998). Such "protection" results in delaying gratification associated with the competing tendencies. In general, we are in a position to examine the delay of gratification subprocesses that underlie "how students becomes masters of their own learning processing" (Zimmerman, 1998, p. 1). Specifically, why is it that some learners with similar academic goals are able to delay gratification over time and obstacles while there are others who cannot? This discrepancy between intentions and accomplishments among some learners is at the heart of the self-regulated learning approach.

In the present paper we first revisit previous work on delay of gratification, beginning with Mischel and his associates, which will serve to establish the importance of examining delay in an academic context. Second, we will summarize previous findings that indicate that learners, who delay gratification, are more likely to use learning strategies and are more motivated to learn. Third, we review the psychological processes that underlie delay from the point of view of Mischel's theory of volition and self-control (Mischel, 1999; Mischel, Cantor, Feldman, 1996). Fourth, implication to education and learning will be discussed within the frame of Zimmerman's (1998) self-regulated learning cycle phases. Zimmerman's cycle phases capture the high contextual specificity in which delay of gratification is based, it incorporates a wide array of self-regulatory processes, and it explains their interaction in cyclical terms during en vivo learning experiences.

Previous Work on Delay of gratification

Serious work on delay of gratification began with Mischel's classic paradigm in which children are asked to choose between a less valuable immediately available reward (e.g., one cookie) and a larger reward (e.g., several cookies) if they wait. In a highly controlled experimental condition, the experimenter explains to the children that if they were able to wait until he or she returns to the room, they would obtain the larger reward. If the children were unable to wait until the experimenter returns, the children could ring a bell that will bring the experimenter back to the room. In this case, the children will receive only the smaller reward. Situational factors, such as whether the goal was visible, were found to influence delay. Individual differences

were also evident, and delay was considered a cross-situational generalized ability that some children possessed more so than did others.

More important for the present discussion, however, were the strategies that children used to facilitate the waiting period (See Table 1). For example, successful children engage in self-ratification of their commitment to wait when they are plagued with temptations. They make concrete plans, imagine the reward in a different form, control their motivation, exert greater effort, enact attention control during the waiting period, and avoid frustration. Other successful strategies were to "think fun thoughts" related to the rewards, self-instruction during the waiting time, structuring of the environment, making social contracts and commitments. Successful children focus on task rather that on the outcomes, enhance their self-efficacy beliefs, maintain positive affect, and use metacognitive strategies (for a review see Metcalfe & Mischel, 1999; Mischel, 1999; Mischel, Cantor, & Feldman, 1996).

Mischel and his associates (Mischel, Cantor, & Feldman, 1996) suggest that commitment to a goal is an ongoing process rather than a discrete instance. Applied to an academic setting, they explain that for example, a student who has a commitment to complete an important academic task may be tempted to have fun with her friends rather than to study. In order to remain task focused over length period of time and obstacles, the student must use several strategies, successively as well as concurrently, to successfully delay the more immediately gratification. For example, the student may remain herself of her previous commitments. Otherwise, the student may succumb to the temptations that will preclude her from accomplishing important academic tasks.

Academic Delay of Gratification

Although Mischel's original work had implications for academic outcomes, most of the work was based on children in non-academic situations rather than with adult learners (e.g., college students) in academic settings. Neither was the original delay paradigm readily adapted to that setting. Further, the fact that until very recently, academic delay of gratification has been considered in research related to academic contexts is surprising given the importance that educators, theorists, and researchers attach to delay as an index of social and educational essential characteristic and endeavors. For example, Pressley and his associates (Pressley et al., 1983), suggest that delay of gratification is important in education and that delay is an essential skill for successful learning over time and in the light of obstacles.

In order to conduct research on adult learners we (Bembenutty, 1997, Bembenutty & Karabenick, 1999) developed an Academic Delay of Gratification Scale (ADOGS) to assess individuals' tendencies in academic delay of gratification (ADOG) by measuring the likelihood that students would select activities associated with long-term academic versus short-term goal satisfaction. For example, students rated their preference for an option that offered immediate gratification, such as "Going to a favorite concert, play, or sporting event, even though it may mean getting a lower grade on an exam in this class to be taken the next day," or a delayed gratification option such as "Staying home and studying to increase your chances of getting a higher grade" (see Appendix)

Students' Use of Motivation, Cognitive Strategies, and Self-regulatory Strategies

In a series of studies using the ADOGS, we (Bembenutty & Karabenick, 1996, Karabenick & Bembenutty, 1998; Bembenutty & Karabenick, 1998; Bembenutty et al., 1998) demonstrated an extensive association between students' preference for delay, motivational tendencies, and use of learning strategies (see Appendix). In general,

students with greater preference for delay of gratification reported that they were more academically motivated, higher in self-efficacy, and intrinsically interested in learning (see Table 2). Students with greater delay preference also reported greater use of cognitive strategies, such as critical thinking, rehearsal, and elaboration, as well as use of metacognition. Finally, students with higher delay of gratification reported using more resource management strategies, such as effort regulation, and control of time and study environment.

These results are consistent with Mischel's earlier work, and are important in demonstrating the links between delay and learners' broader self-regulatory tendencies. And although the correlational nature of the evidence is recognized, it supports the view that learners who delay gratification also make use of such strategies, at least in part, to remain task focused (Not to have found such relationships would have raised doubts about the role of strategies in facilitating delay).

An Expectancy-Value Motivational Analysis

In addition to the role of strategies, delay can also be viewed from a motivational choice perspective. Indeed, Mischel (1974) recognized very early that the subjective value of the reward and the expectation of obtaining it determines delay. For example, Mischel (1974) posited "it is necessary to consider the determinants of the individual's choice to delay for the sake of more preferred delayed outcomes" (p. 287). Accordingly, children would not delay if they had little confidence of obtaining the more valuable (delayed) reward. Early (Atkinson, 1966) and contemporary expectancy-value motivation theories (Eccles, Wigfield, & Schiefele, 1998; Feather, 1993; Wigfield & Eccles, 1992) posit importance, utility, interest, cost of success (time, effort, and consequence), and expectancy of success as determinants of task choices. In an academic context, we examined whether for each motivational determinant, the difference between the immediate and delayed option would be related to delay preference (Bembenutty, 1999a, 1999b; Karabenick & Bembenutty, 1998). As shown on Table 3, the results consistently support a motivational choice analysis. Students' ratings of the importance, interest, utility, and cost of the delay versus the immediate alternatives (i.e., the difference between them) were related to the likelihood that students reported they would delay.

A Volitional Analysis

Choosing to enact intentions would require the ability to foregoing immediate impulse and delay gratification for the sake of long-term valuable outcomes (Mischel, 1974), as well as an action control orientation (Kuhl, 1994). However, these abilities per se do not guarantee the probability of a desire outcome. Academic success will depend also to students' motivational tendencies and well as their ability to skillfully use volitional strategies, such as self-efficacy control, motivational control, and resource management available to them (see Table 3). Further, successful students need to engage in self-regulation or volitional control to maintain intentions when attractive alternative may arise (Corno, 1993; García et al., 1998; McCann & García, 1999; Zimmerman, 1989). Evidence suggests that students also regulate their effort and motivation by using cognitive, volitional, and motivational strategies (Wolters, 1998, 1999).

Despite a widespread acceptance of the relationship between delay of gratification with students' motivation, use of cognitive and volitional strategies, and despite of its

role in achievement and performance, there has not yet been a thorough evaluation of the mechanism that explains what make possible these associations. One of the most comprehensive theories about delay is selected for review here, that is Mischel's theory of willpower and self-control. We outline Mischel's work on delay of gratification.

Mischel's Paradigm: Mechanism of Self-regulation

According to Mischel, the process and mechanism of delay of gratification is one in which individuals engage in self-control and use of willpower. This refers to individuals' self-regulation of instances in which automatic responses will not be sufficient to enact intentions and goals (Mischel, Cantor, Feldman, 1996). From this point of view, the individual is actively in control of the process of goal achieving and in control of the consequence of his/her actions. Mischel's (1974; Mischel, Cantor, & Feldman, 1996) distinguishes between the "goal choice" phase before engaging on delay and the "goal control" phase after an intention is established. Goal choice will be determined, for example, by the individual's expectancy, trust, and vicarious experience. In contrast, the goal control phase is a process in which the individual engages cognitively and behaviorally in actions to maintain goal selections. Thus, the successful maintenance of the goal would depend on the individual's use of cognitive strategies to divert the adverse influence of distracting alternatives. Indeed, these two phases are similar to Kuhl's (1985) action control pre-and post-decisional phases, as well as Heckhausen and Gollwitzer's (1987) phases of goal-directed behavior.

Mischel and his associates frame willpower and self-control within the cognitive-affective personality system (CAPS), that is, the interaction between the person's construal of situations and cognitive-affective mediating units (see Table 4; Mendoza-Denton et. al., 1997; Mischel, 1999; Mischel & Shoda, 1998). They highlight five personal maneuvers in which individuals interact with their environment and situations: (a) the individuals' way of *encoding* themselves and the situations they encounter will influence them and the outcomes of their behavior, (b) their *expectancy* for success and *beliefs*, (c) *affective responses*, *emotions*, and *feelings*, (d) *goals* and *values*, and (e) *competencies* and *self-regulatory plans*. These important personal variables distinguish individuals and will determine the choice and maintenance of delay behavior.

Concerning the mechanism that explains how individuals engage in willpower to overcoming stimulus control, Metcalfe and Mischel (1999) posit that the interaction of the "*hot*" and "*cool*" systems is a paradigm that serve to explain pursuing and enactment of goals over time and obstacles (see Figure 1). The hot system is emotional, simple, reflexive, fast, accentuated by stress, and stimulus control. By contrast, the cool system is cognitive, complex, reflective, slow, attenuated by stress, and self-control. These two systems interact to facilitate goal pursuing. The hot/cool systems are based on the cognitive-affective personality system, in which the units interact to determine the outcome and selection of behavior. The cool system secures enactment of goals while the hot system responds to impulses, with high tendency for instant gratification and satisfaction of pleasure. The determinants of which system will be activated and the interaction between the two systems are for example, first, the developmental phase of the individuals. For example, a young person may not have well developed the cool system. Second, stress could favor the activation of the hot system. Third, chronic activation of a spot in either the hot or cool system could affect the activation of that system at later time.

In an academic context, successful delay of gratification will depend of which system dominates. For example, if a student has homework, the input representation

(homework) may lead primarily to the hot system (having fun with friends) indicating that the she does not want to complete the homework. However, the cool system is activated by the awareness of negative consequences and them by the enhancement of self-efficacy. As Figure 1 illustrates, the student is able to delay gratification.

According to Mischel, control strategies enhance delay of gratification within the hot/cool systems (Metcalfe & Mischel, 1999). Two examples of them are: (a) "when the hot system is dominant, salient exposure of the hot stimulus will tend to elicit the automatic relevant response," (b) "the eliciting power of the hot stimulus will be diminished when it is present but not salient exposed during the period in which the individual is trying to inhibit the go response. Operationally, obscuring the tempting object should facilitate delay of gratification" (see Table 5).

Our evidence is consistent with Mischel's approach in that correlations between delay and both students' motivational tendencies and use of learning strategies map rather well onto Mischel's goal selection and goal control phases. Although the evidence does not bear on whether the phases are distinct or successive in operation (Corno, 1993), it appears that more motivated students, who have chosen to accomplish achievement goals are also those more likely to use the regulatory strategies of goal control and to delay gratification as a consequence. Relationships between cognitive and metacognitive strategies and delay also support the proposed cool system that learners employ to reach goals, such as planning, monitoring, and regulating their goal-directed efforts.

Educational Implications

In the introduction, we noted that the importance of academic delay of gratification for successful performance and achievement is widespread in both the general psychology and in educational psychology and that it is essential to examine the underlie mechanisms pertaining this important construct. At this point, we are in a position to offer certain educational implications regarding this important motivational construct that is in the cornerstone not only of psychological well being, but the successful sustaining learning over time and obstacles.

Given the importance of delay of gratification, we believe that teachers could teach delay to their students. Teachers could serve as models that personalize delay by relate to the students their personal experience of successful delay. Similarly, teachers could suggest to their students ways in which by delaying gratification they can successfully complete academic tasks. Students could learn how to self-monitor their activities, how to plan actions, and avoid distraction if they are willing to give up immediate satisfaction of impulses. Teachers could include in their classroom activities ways in which learners could engage and give assignments in which the students could practice delay out of their classroom.

Teachers could also teach motivational strategies that facilitate delay to their students. Specifically, we know that enhancement of self-efficacy beliefs is associated with delay (see Table 3). Our studies show that learners use phrases such as "I tell myself that I will be able to understand and remember this course material," "I tell myself, 'I can do this'" (McCann & García, 1999; Schunk, 1991; Schunk, & Zimmerman, 1997). Similarly, learners can learn self-management strategies, such as managing their time and controlling their study environment (Pintrich & De Groot, 1990), as well as planning and having a future time perspective (Brickman, & Miller, 1999; Gjesme, 1983; Husman & Lens, 1999; Lens & Rand, 1997).

Teachers can also teach cognitive strategies to their students (McKeachie, 1999; Schunk, 1996; Pintrich & Schunk, 1996; Pressley & McCormick, 1995). We know that organization, rehearsal, elaboration, and critical thinking are some of the cognitive strategies associated with delay. Consequently, we believe that if the students engage in these activities they will be willing to delay gratification. Likewise, teaching the value, important, and utility of academic tasks may serve to facilitate delay (McKeachie, 1999). Our research suggests that students who place high value on academic task have greater preference for delay alternatives rather than for immediately available but less valuable activities.

In relation to specific implications of delay to education, the work of Zimmerman (1998) on self-regulation of learning deserves particular attention since he has discussed self-regulatory strategies in academic settings and his theory are considerably broader in scope in relation to education. In addition, given that Mischel, in essence, has developed a motivational paradigm, a learning paradigm is warranted. In other words, a learning paradigm may consider the active participation of the learners, feedback during the learning process, self-evaluation during the delay time, and mastery goal orientation during delay,

Zimmerman's Self-Regulated Learning Cycle Phases

Zimmerman has significantly contributed to our understanding of students' persistent in the light of distraction by helping us to acknowledge, from a micro-analytic point of view, the importance of self-regulation for learners. Self-regulation refers to the mechanism in which learners engage in sustaining cognition, behavior, and emotions to pursue goals and intentions (Schunk, 1994; Zimmerman & Bandura, 1994). According to Zimmerman, (1986), self-regulated learners refers to students who are "metacognitively, motivationally, and behaviorally active participants in their own learning processes" (p. 308). In other words, they are skilled in using learning strategies and are able to put effort to ensure goals. Self-regulated learners are highly motivated, high self-efficacious, and use their skills to acquire knowledge (Pintrich & De Groot, 1990; Schunk, 1994; Zimmerman, 1989). In sum, self-regulation or volitional strategies play an essential role in students' academic achievement by helping learners to maintain academic goals.

Zimmerman (1998) proposes that skillful self-regulated students are those that use volition or performance control to maintain intention in the light of distracting alternatives (Zimmerman, 1998). He placed self-efficacy beliefs, social modeling, and mastery as the pivotal key of self-regulation. Like Bandura (1986), he explains that there is a reciprocal determinant of behavior, specifically, in self-regulated functioning. That is, that the person, behavior, and environment interact in a process and feedback (Bandura, 1997; Schunk, 1994; Zimmerman, 1989, 1998; Zimmerman & Risemberg, 1997).

Recently, Zimmerman (1998) has explained the process of self-regulation according to a cyclical model of self-regulation (see Figure 2). First, the *forethought phase* refers to a selection of goals and strategic planning that are influenced by self-efficacy beliefs, goal orientation, and intrinsic interest. Second, the *performance* or *volitional control phase* refers to once the learner has chosen a goal or strategic planning they will engage in attention selection, self-instruction, and self-monitoring to secure the expected outcomes. Third, the *self-reflective phase* refers to when learners engage in self-evaluation, use of attributions, and self-reactions to examining their progress, to compare their performance with the goals, and to identify errors. Accordingly, skillful

self-regulated learners and naive learners will react differently at each of the phases. To illustrate, self-regulated learners would establish a hierarchy of goals, have a learning goal orientation, and they will be high self-efficacious. In contrast, naive self-regulated learners would have nonspecific goals, will be performance oriented, and will be low self-efficacious (Schunk, 1994; Schunk & Ertmer, 1999; Zimmerman, 1989, 1998).

Our evidence is consistent with Zimmerman's cyclical-phases model. More skillful self-regulated learners who are more self-efficacious, have learning rather than avoidance goal orientations, intrinsic task interest, and who use the many personal, performance, and environmental strategies are those more likely to delay gratification when faced with attractive non-task alternatives. Although it would be possible to posit delay of gratification having an influence at any of the phases of Zimmerman's model, it would be most evident at the second stage at which point volitional, self-regulatory strategies are employed. We suggest that a component of learners' engagement in attention selection, self-instruction, and self-monitoring to secure the expected outcomes is to resist attractive alternatives and delay gratification.

Discussion

As this review indicates, academic delay of gratification is associated with an array of motivational, cognitive and self-regulatory strategies used by learners to secure academic success. However, the association of delay to students' learning process is far from universal, with some of the studies reviewed here indicating that delay is highly related to only some aspect of the students' learning experience (e.g., self-efficacy, intrinsic and extrinsic motivation, and effort regulation) and in other instances not related at all (e.g., control beliefs, and test anxiety). We saw that Mischel's approach serves to provide an accurate account for the mechanisms that underlie successful delay of gratification. From a motivational perspective, Mischel explain well the different processing strategies adopted by learners in response to the need to sustain effort over time in the face of obstacles. His theory considers the cognitive processes that underlie delay (Mischel, 1973). Further, he believes that self-regulation of learning depends on the situation in which the learners are and not on traits or dispositions and that, the cause of behavior is based on a reciprocal interaction between the person and the situation.

With regard to the cognitive-affective units in the personality system, which serves to enhance delay of gratification, the findings from our work support the contention that students encode themselves, other, and their situations in a way that favor enactment of goals over obstacles and time. Our findings support the notion that students' expectancy for success and beliefs play a preeminent role in purpose behavior. In particular, self-efficacy is an essential determinant of delay preferences. Control of affect, such as control of motivation and emotion, is another behavior in which learners engage. We found that skillful learners set goals for themselves and follow them true to completion over length period of time. They approach learning with a task goal orientation, but also with a performance goal orientation (Bembenutty, 1999b). Furthermore, successful self-regulated learners place greater value on task that will secure academic achievement rather than instant gratification of impulses. Similarly, they consider delay alternatives more valuable, interesting, important, and useful than the competing non-delay alternatives. Our findings show that successful learners engage in long-term planning and use self-regulatory strategies. They not only use motivational strategies, but they also use cognitive strategies, such as rehearsal, elaboration, critical thinking, and metacognition to secure task completion. One of

Mischel's greatest contributions, therefore, is to explain delay of gratification in a macro-level of personality and motivation. However, the new demands for specificity in the analysis of the learning processes requires a micro-analytic conception of delay of gratification. It is in this point in which Zimmerman provides a great contribution to the understand of delay in a specific academic context.

Mischel's goal choice phase corresponds to Zimmerman's forethought phase and Mischel's goal control phase corresponds to Zimmerman's performance control phase. Mischel does not distinguish a self-reflection phase but he does speak about emotional reactions, which are similar to the self-reactions discussed by Zimmerman (1998) and Bandura (1997). Although Mischel sees chronic activation of dysfunctional hot reactions, he does not decompose this into cyclical performance efforts. One advantage of a cyclical model of self-regulation is that it envisions delay of gratification as a series of learning cycles rather than a single motivational event. It assumes that information from on-going learning activities, such as perceived progress, has a lot to do with whether students are willing to continue to delay gratification. It assumes that delay of gratification is a sequence of decisions that is determined by a self-regulatory feedback cycle rather than by merely pre-existing expectances or values. For example, a student who decides to give up television watching to increase his or her studying may become unwilling to continue if he or she fails the first test. On the other hand, if the result's grade improves noticeably, if he or she has set the appropriate self-regulatory self-evaluation standard. These self-reactions should strengthen forethought perceptions of self-efficacy cyclically, and this should strengthen the students' resolve to delay gratification further. Although we have not collected data on these learning dimensions of delay experiences, it is central in understanding delay of gratification regarding academic achievement.

Although the self-report technique of determining delay tendencies in adults (i.e., the ADOGS) appears to be reliable (Bembenutty, 1997) and extend across several samples of learners (see Table 2 and Table 3), and that social desirability is not of concern (Bembenutty & Karabenick, 1998), further research is suggested that employs behavioral assessment in actual learning settings. Assessment of delay in an academic context would require sensitivity to variations in situations in which many variables appear to influence behavior. One of the characteristics of controlled performance studies is in not having attractive alternatives present. Although that control may eliminate unwanted uncontrolled situational variation, it may also eliminate a critical element that is a persistent component of situation in which much learning takes place. Clearly further studies are needed that can explicate the processes and mechanisms that underlie sustaining learning through academic delay of gratification over time and in the light of obstacles.

Conclusion

In this paper, we have examined delay of gratification within an academic context and found that skillful self-regulated learners are willing to delay gratification. Evidence from the present literature reviewed here indicates that delay of gratification is related to students' motivational tendencies, use of cognitive strategies, and use of resource management strategies. This review places delay within a network of motivational and self-regulated constructs known to secure academic success. In other works, delay is one of many components of students' toolkits for learning if they are to complete numerous and difficult academic task in the face of distraction and over time.

Our review, then, should provide some reassurance to researchers, theorists, and educators of the importance of considering students' willingness for delay when examining their academic progress and achievement. Failing to consider delay of gratification as an important component of the learning process could be considered a tremendous fiasco in our aim to understand the process of willpower and self-regulation. This is of particular interest in the light that high preference for delay of gratification is associated with high academic performance such as high final course grade and high grade point average and that it serves to secure academic success over time and obstacles.

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Table 1

Sample of Strategies Used to Secure Successful Delay of Gratification

- Self-ratification of commitments
- Engage in different information processing before and after goal choice
- Estimate the consequences
- Accentuate the subjective value of the delayed rewards
- Make concrete plans
- Imagine the reward in a different form
- Control of motivation
- Exert greater effort
- Enact attention control during the waiting period
- Avoidance of frustration
- Think fun thoughts related to the rewards
- Self-instruction during the waiting time
- Structure of the environment
- Make social contracts and commitments
- Focus on task rather that on the outcomes
- Enhance their self-efficacy beliefs
- Maintain positive affect
- Use of metacognitive strategies

Note: Adapted from Metcalfe & Mischel, (1999); Mischel, (1999); Mischel, Cantor, & Feldman, (1996).

Table 2

Descriptive Statistics and Bivariate Correlations between Academic Delay of Gratification with Students' Motivation, Use of Cognitive and Self-Regulatory Strategies in Study 1 and Study 2

	Study 1			Study 2		
Variable	M	SD	r with ADOG	M	SD	r with ADOG
Motivation						
Intrinsic motivation	4.83	.47	.32***	4.3	.61	.40***
Extrinsic Motivation	5.42	1.08	.35***	3.8	.94	.11
Task Value	5.40	.18	.30***	4.1	.99	.22*
Control of Learning	5.70	.94	.03	NA	NA	NA
Self-Efficacy	5.42	1.14	.20***	4.1	.80	.11
Test Anxiety	3.81	1.37	.03	2.6	1.1	.02
Expectancy of Success	4.0	.91	.23*	NA	NA	NA
Cognitive Strategies						
Elaboration	4.63	1.05	.38***	3.2	.72	.59***
Rehearsal	4.60	1.28	.42***	2.6	1.4	.28**
Organization	3.75	1.24	.40***	3.4	.86	.15
Critical Thinking	4.20	1.26	.18**	3.6	.82	.25*
Metacognition	4.28	.96	.49***	3.6	1.0	.30**
Conditional Knowledge	NA	NA	NA	3.4	1.0	.26*
Retrieval	NA	NA	NA	3.1	.88	.04
Self-Regulatory Strategies						
Effort Regulation	4.82	1.34	.58***	4.10	.89	.24*
Action Control	NA	NA	NA	.27	1.0	.21*
Control of Study Time	4.60	1.15	.62***	2.9	1.1	.55***
Peer Learning	2.91	1.45	.09	2.0	1.1	-.13
Help Seeking	3.42	1.29	.14**	NA	NA	NA

Note: Significance levels are denoted as follows: *$p < .05$; **$p < .01$; ***$p < .001$. NA = Not available. Study 1 ($N = 369$) is from Bembenutty, (1997); Study 2 ($N = 113$) is from Bembenutty & Karabenick, (1998).

Table 3

Descriptive Statistics and Bivariate Correlations between Academic Delay of Gratification with Students' Motivational Determinants and Use of Volitional Strategies in Study 3 and Study 4

	Study 3			Study 4		
Variable	M	SD	r with ADOG	M	SD	r with ADOG
Motivational Determinants						
Importance	1.16	.89	.40***	1.24	1.29	.59***
Utility	2.01	.78	.28***	2.24	.99	.38***
Interest	-.91	1.17	.26***	-.56	1.31	.62***
Cost of Success	-.27	.56	-.23***	-.17	.70	-.38**
Volitional Strategies						
Self-Efficacy Control	-.01	1.00	.22**	5.02	1.07	.52***
Motivational Control	-.00	1.00	-.11	3.67	1.27	.15
Resources Control	-.01	1.00	.11	3.40	1.33	.18

Note: Significance levels are denoted as follows: *$p < .05$; **$p < .01$; ***$p < .001$. Study 3 ($N = 250$) is from Bembenutty, (1999a); Study 4 ($N = 102$) is from Bembenutty, (1999b). Means for volitional strategies are standardized.

Table 4

Mischel's Cognitive-Affective Units in the Personality Mediating System and Examples in Academic Delay of Gratification

Cognitive-Affective Units	Examples in Academic Delay of Gratification
• **Encodings:** Self, others, events, and situations	Visualization of positive outcomes, perceiving task as self-relevant, rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation
• **Expectancies and Beliefs:** Self-efficacy, expectancies and beliefs about the self, others, events, and situations	Enhance self-efficacy beliefs, social and academic expectancies, control beliefs about learning
• **Affects:** Feelings, emotions, and affective responses	Test anxiety, emotional control, motivational control
• **Goals and Values:**	Task, performance, and avoidance goal orientations, task value (importance, utility, interest, perceived cost of success), social values (a sense of accomplishment, freedom, self-respect, wisdom)
• **Competencies and Self-regulatory Plans:** Plans and strategies	Peer learning, help seeking, effort regulation, regulation of time and study environment

Note: Adapted from Mischel & Shoda, (1995).

Table 5

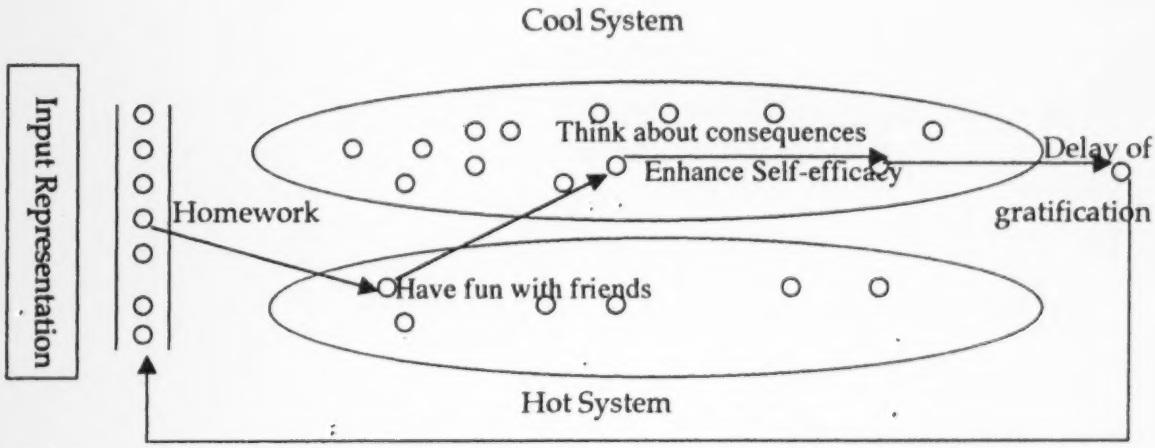
Control Strategies that Enhance Delay of Gratification

- "When the hot system is dominant, salient exposure of the hot stimulus will tend to elicit the automatic relevant response."
- "The eliciting power of the hot stimulus will be diminished when it is present but not salient exposed during the period in which the individual is trying to inhibit the go response. Operationally, obscuring the tempting object should facilitate delay of gratification."
- "When the hot stimulus is present during the period in which the individual is trying to inhibit the go response, its eliciting power can be diminished by avoiding attending to it. This is the internal self-control parallel to external control by obscuring (e.g., covering) the rewards and should facilitate control in the same manner."
- "When the hot stimulus is present, its salience and power can be decreased by concurrent exposure to external stimuli that activate nonrelevant hot- or cool-system networks."
- "When the hot stimulus is present, the individual can decrease its salience and power by internally activating nonrelevant cool- or hot-system networks."
- "When the cool rather than the hot characteristics of the nominal stimulus are presented, as when a picture of the object rather than the object itself is shown, cool-system control is enhanced and the go response is inhibited."
- "When a person thinks about the cool properties and aspects of the stimulus rather than the hot properties, delay behavior is enhanced."
- "Because development of the cool system trails that of the hot system, with increasing age, control should become easier."
- "As stress increases, dominance should increasingly shift from the cool system to the hot system, making delay of gratification more difficult."
- "Chronic stress has a selective negative impact on the cool system, and hence chronic stress should be reflected in systematic and relatively stable decreases in impulse control."

Note: Adapted from Metcalfe & Mischel, (1999).

Figure 1

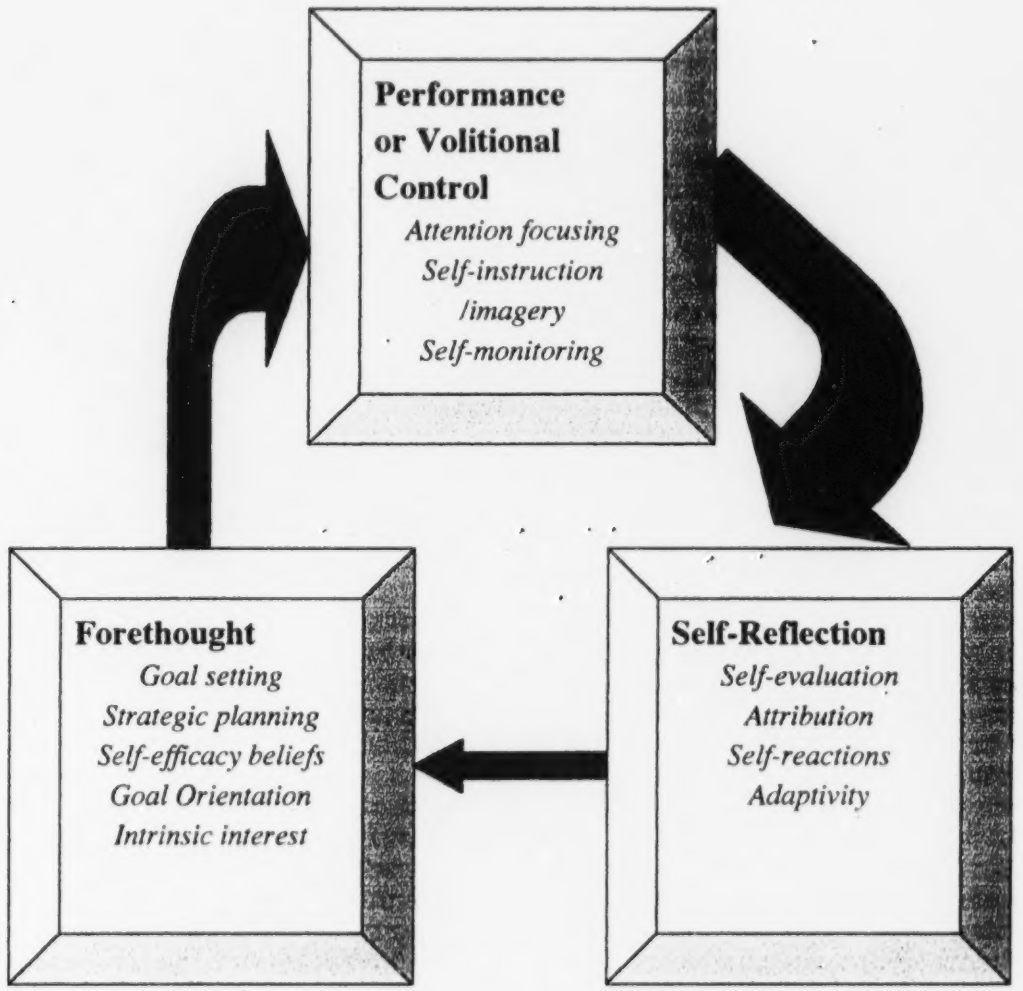
An Example of the interaction between the Hot/Cool Systems



Note: Based on Metcalfe & Mischel, 1999. The input representation (homework) leads primarily to the hot system (having fun with friends) indicating that the student does not want to complete the homework. However, the cool system is activated by the awareness of the negative or positive consequences and them enhance her self-efficacy beliefs. The student successfully delays gratification.

Figure 2

Zimmerman's Academic Learning Cycle Phases and Subprocesses of Self-Regulation



Note: Adapted from Zimmerman, (1998).

Appendix

Situation 1

Which of the following would you choose to do?

A. Delay studying for an exam in this class the next day even though it may mean getting a lower grade, in order to attend a concert, play, or sporting event. *OR*

B. Stay home to study to increase your chances of getting a high grade on the exam.

__Definitely choose A __Probably choose A __Probably choose B __Definitely choose B

Next indicate (by writing a number in front of each of the statements) how strongly you agree or disagree with the statements below use the following scale:

1 = Strongly Disagree2 = Disagree 3 = Neither Agree nor Disagree

4 = Agree 5 = Strongly Agree

Going to a favorite concert, play or sporting event. This is something that would...	Staying home to study This is something that would...
_____ Be important for me	_____ Be important for me
_____ Be useful for me	_____ Be useful for me
_____ Be interesting to me	_____ Be interesting to me
_____ Have negative consequences for me	_____ Have negative consequences for me
_____ Take a lot of time or effort	_____ Take a lot of time or effort
_____ I would like to do	_____ I would like to do